HAZARDOUS MATERIALS MANAGEMENT

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INTRODUCTION

The purpose of this analysis is to determine if the proposed East Altamont Energy Center (EAEC) has the potential to cause a significant impact on the public as a result of the use, handling or storage of hazardous materials at the proposed facility. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce impacts to the extent feasible.

This analysis does not address potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and workers can be provided with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials. Staff's **Worker Safety and Fire Protection** analysis describes the requirements applicable to the protection of workers from such risks.

The applicant has proposed to store four hazardous materials at the EAEC in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j): anhydrous ammonia, sodium hydroxide, sulfuric acid, and hydrogen gas (see Table 8.12-3 of the Application for Certification [AFC] and revised in Supplement B, dated October 9, 2001, Table HM-1). Of these, anhydrous ammonia presents the greatest potential for off-site consequences. Anhydrous ammonia has high internal energy when stored as a liquefied gas at elevated pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air, where it can be transported in the atmosphere and result in high down-wind concentrations.

Other hazardous materials stored in smaller quantities, such as mineral and lubricating oils, corrosion inhibitors and water conditioners, will be present at the proposed facility. Hazardous materials used during the construction phase include gasoline, diesel fuel, oil, welding gases, lubricants, solvents and paint. No acutely toxic hazardous materials will be used onsite during construction. None of these materials pose significant potential for off-site impacts due to the quantities on-site, their relative toxicity, and/or their environmental mobility. Although no natural gas is stored, the project will involve the construction and operation of a natural gas pipeline and handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. This pipeline will be 1.8 miles in length including on and off-site segments (EAEC 2002a).

The EAEC will also require the transportation of anhydrous ammonia to the facility. Analysis of the potential for impact associated with such deliveries is addressed below.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials management. Staff's analysis examines the project's compliance with these requirements.

FEDERAL

The Superfund Amendments and Reauthorization Act of 1986 (Pub. L. 99-499, §301,100 Stat. 1614 [1986]), also known as SARA Title III, contains the Emergency Planning and Community Right To Know Act (EPCRA) as codified in 42 U.S.C. §11001 et seq. This Act requires that certain information about any release to the air, soil, or water of an extremely hazardous material must be reported to state and local agencies.

The Clean Air Act (CAA) of 1990 (42 U.S.C. §7401 et seq. as amended) established a nationwide emergency planning and response program and imposed reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials. The CAA section on Risk Management Plans - codified in 42 U.S.C. §112(r) - requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of the CAA are reflected in the California Health and Safety Code, section 25531 et seq.

STATE

The California Accidental Release Prevention Program (Cal-ARP) - Health and Safety Code, section 25531 - directs facility owners storing or handling acutely hazardous materials in reportable quantities, to develop a Risk Management Plan (RMP) and submit it to appropriate local authorities, the United States Environmental Protection Agency (EPA), and the designated local Administering Agency for review and approval. The plan must include an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any preexisting evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This new, recently developed program supersedes the California Risk Management and Prevention Plan (RMPP).

Section 25503.5 of the California Health and Safety Code requires facilities which store or use hazardous materials to prepare and file a Business Plan with the local Certified Unified Program Authority (CUPA), in this case the Alameda County Department of Environmental Health. This Business Plan is required to contain information on the business activity, the owner, a hazardous materials inventory, facility maps, an Emergency Response Contingency Plan, an Employee Training Plan, and other recordkeeping forms.

Title 8, California Code of Regulations, section 5189, requires facility owners to develop and implement effective safety management plans to ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

Title 8, California Code of Regulations, section 458 and sections 500 – 515, set forth requirements for design, construction and operation of vessels and equipment used to store and transfer anhydrous ammonia. These sections generally codify the requirements of several industry codes, including the ASME Pressure Vessel Code, ANSI K61.1 and the National Boiler and Pressure Vessel Inspection Code.

California Health and Safety Code, section 41700, requires that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

Gas Pipeline

The safety requirements for pipeline construction vary according to the population density and land use, that characterize the surrounding land. The pipeline classes are defined as follows (Title 49, Code of Federal Regulations, Part 192):

Class 1: Pipelines in locations within 220 yards of ten or fewer buildings intended for human occupancy in any 1-mile segment.

Class 2: Pipelines in locations within 220 yards of more than ten but fewer than 46 buildings intended for human occupancy in any 1-mile segment. This class also includes drainage ditches of public roads and railroad crossings.

Class 3: Pipelines in locations within 220 yards of more than 46 buildings intended for human occupancy in any 1-mile segment, or where the pipeline is within 100 yards of any building or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12 month period (the days and weeks need not be consecutive).

Class 4: Pipelines in locations within 220 yards of building s with 4 or more stories above ground in any 1-mile segment.

The natural gas pipeline will be designed for Class 3 service and will meet California Public Utilities Commission General Order 112-D and 58-A standards as well as various PG&E standards. The natural gas pipeline must be constructed and operated in accordance with the Federal Department of Transportation (DOT) regulations, Title 49, Code of Federal Regulations, sections 190, 191, and 192:

Title 49, Code of Federal Regulations, section 190 outlines the pipeline safety program procedures;

Title 49, Code of Federal Regulations, section 191, Transportation of Natural and Other Gas by Pipeline; Annual Reports, Incident Reports, and Safety-Related Condition Reports, requires operators of pipeline systems to notify the U.S. Department of Transportation of any reportable incident by telephone and then submit a written report within 30 days;

Title 49, Code of Federal Regulations, section 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, specifies minimum safety requirements for pipelines and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use, that characterize the surrounding land. This section contains regulations governing pipeline construction, which must be followed for Class 2 and Class 3 pipelines.

LOCAL AND REGIONAL

The Uniform Fire Code (UFC) contains provisions regarding the storage and handling of hazardous materials in Articles 79 and 80. The latest revision to Article 80 was adopted in 1997 (Uniform Fire Code, 1997) and includes minimum setback requirements for outdoor storage of ammonia.

The California Building Code contains requirements regarding the storage and handling of hazardous materials. The Chief Building Official must inspect and verify compliance with these requirements prior to issuance of an occupancy permit. A further discussion of these requirements is provided in the **Seismic Issues** portion of this document.

If not for Energy Commission jurisdiction, the Alameda County Environmental Management Department would be the issuing agency for the Consolidated Hazardous Materials Permit. The permit review and mitigation authority covers hazardous materials, hazardous waste, compressed gases and tiered treatment, the Hazardous Materials Business Plan, and the Risk Management Plan for anhydrous ammonia. In regards to seismic safety issues, the site is located in Seismic Risk Zone *3*. Construction and design of buildings and vessels storing hazardous materials must conform to the 1997 Uniform Building Code, the 1998 California Building Code, and the Alameda County Building Code.

SETTING

The proposed project is to be located in an unincorporated area of Alameda County, approximately one mile west of the San Joaquin County line, and one mile south and east of the Contra Costa County line. The site is approximately 8 miles northwest of the city of Tracy, 12 miles east of Livermore, 5 miles south of Byron, and less than one mile from the San Joaquin County border and the Mountain House Community Service District, a new town just starting Phase 1 of construction. Large infrastructure projects, principally power generation and transmission facilities, dominate the surrounding area within one mile of the project. The land uses surrounding the proposed facility consist of mixed agriculture, and low-density rural residences. Hazardous materials use and transportation are commonly associated with the industrial/agricultural activities in the area. Thus, hazardous materials are currently transported, stored, and used in the project vicinity.

Several factors associated with the area in which a project is to be located affect its potential to cause public health impacts from an accidental release of a hazardous material. These include:

Local meteorology;

Terrain characteristics; and

Location of population centers and sensitive receptors relative to the project. Meteorological conditions, including wind speed, wind direction and air temperature, affect the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the level of public exposure to such materials and the associated health risks. When wind speeds are low and stable, dispersion is severely reduced and can lead to increased localized public exposure.

Recorded wind speeds and ambient air temperatures are described in the Air Quality section of the AFC (EAEC 2001a, AFC chapter 8.1). Staff agrees with the applicant that use of atmospheric stability class F (stagnated air, very little mixing) and one meter per second wind speed are appropriate assumptions for use in the modeling of an accidental release. Staff believes these assumptions correspond to a reasonably conservative scenario that reflects worst case atmospheric conditions. The location of elevated terrain (terrain above the power plant stack height) is often an important factor to be considered in assessing potential exposure. The emissions resulting from an accidental release may impact high elevations before impacting lower elevations. With the local terrain elevated several hundred feet immediately to the west, it is expected that this project will be affected by elevated terrain. No receptors are located on the elevated terrain to the west. However, these hills contribute to the persistent winds in the project vicinity and would thus contribute to the rapid dispersion and transport of ammonia from the property in the event of a storage tank rupture.

The general population in the project vicinity includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. Figure 8.6-1 (AFC) shows the location of the closest sensitive receptor in the project vicinity. The nearest sensitive receptor is a public elementary school (Mountain House School) located approximately 0.9 mile south of the project.

IMPACTS AND ANALYSIS

Staff thoroughly reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals, including natural gas, were evaluated.

METHODOLOGY

In order to assess the potential for released hazardous materials to travel off-site and impact the public, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that hazardous chemicals are frequently used at power plants. Therefore, staff conducted its analysis by examining the need for hazardous materials, the choice of chemical to be used and its amount, the manner in which the applicant will use the chemical, the manner it will be transported to the facility and transferred to facility storage tanks, and the way the applicant chooses to store the material on-site. Staff reviewed the applicant’s proposed engineering controls and administrative controls concerning hazardous materials usage. Engineering controls are those physical or mechanical systems (such as storage tanks or automatic shut-off valves) which can prevent a spill of hazardous material from occurring or which can limit the spill to a small amount or confine it to a small area. Administrative controls are those rules and procedures that workers at the facility must follow that will help to prevent accidents or keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off-site and causing harm to people.

Staff conducted a thorough review and evaluation of the applicant's proposed use of hazardous materials as described by the applicant in the AFC (Sections 2.2.10 and 8.12) and in data responses. Staff's assessment followed the five steps listed below:

> Step 1: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in Tables 8.12-2 and 8.12-3 of the AFC and determined the need and appropriateness of their use. If less toxic materials were available, staff suggested their use instead.
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> Step 2: Those chemicals, proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off the site and impact the public, were removed from further assessment.
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> Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different size transfer-hose couplings and administrative controls such as worker training and safety management programs.
>
> Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.
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> Step 5: Staff analyzed the potential impacts to the public of a worst-case spill of hazardous materials with the mitigation measures proposed by the Applicant. If the mitigation methods proposed by the applicant are found to be sufficient, no further mitigation will be recommended. If the mitigation proposed by the Applicant is found to be insufficient to reduce the potential for adverse impacts to an insignificant level, staff will propose additional prevention and response controls to reduce potential impacts to an insignificant level.

PROJECT IMPACTS

Storage and Use of Small Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps 1 and 2 that most of the hazardous materials proposed for use at the EAEC pose a minimal potential for off-site impacts, as they will either be stored in a solid form, in smaller quantities, or have very low toxicity. These hazardous materials were thus removed from further assessment. For example, one such group of chemicals is the scale inhibitors chosen for use at the site. Scale inhibitors are used to control and reduce the potential for scale and corrosion to form within the pipeline system. The scale control agents listed in Table 8.12.2 of the AFC include phosphonate for the reverse osmosis unit and polyacrolate in the cooling tower.

These chemicals are safer to use than others often used at other facilities for this purpose, such as hydrazine. Staff has determined that the potential for impacts on the public are insignificant if the applicant uses those or similar scale inhibitors and corrosion controllers mentioned above. See Table 8.12.2 and HM-2 of Supplement B for a list of chemicals that will be used at the power plant.

During the construction phase of the project, including construction of the linear facilities, the only hazardous materials proposed for use include paint, paint thinner, cleaners, solvents, sealants, gasoline, diesel fuel, motor oil, hydraulic fluid, welding flux and gases, lubricants and emergency refueling containers. Any impact resulting from spills or other releases of these materials will be limited to the site due to the small quantities involved. Fuels such as fuel oil #6, mineral oil, lube oil, and diesel fuel are all of very low volatility and represent a limited off-site hazard even in larger quantities (Section 8.12.2.1).

The proposed use of hydrogen gas poses a risk of explosion. However, the amounts that will be present pose no risk of off-site blast effects. Figure 8.12-1 from the AFC indicates that the proposed location for the hydrogen trailer would be about 75 feet from the combustion turbine generator of the eastern most generating unit. Proposed Condition of Certification **HAZ- 11** requires storage of the hydrogen cylinders in an area isolated from combustion sources and away from potential damage of a turbine over speed event. The tanks and piping that are near potential traffic hazards will be protected from vehicle impact by traffic barriers.

After removing from consideration those chemicals that fit into Steps 1 and 2, staff continued with Steps 3, 4 and 5 to review the only remaining hazardous materials: sodium hydroxide, sulfuric acid, hydrochloric acid, sodium hypochlorite, petroleum fuels, natural gas, and anhydrous ammonia.

Storage and Use of Large Quantity Hazardous Materials

Sodium hydroxide, anhydrous ammonia, and sulfuric acid will be present in excess of the Reportable Quantity (RQ) and therefore must be included in the Hazardous Materials Business Plan (HMBP). Although not reportable, sodium hypochlorite will also be present in large quantities. Hydrochloric acid (HCl) will be present at the site in large quantities once every three to five years and at start-up, but is not stored on site. During the typical operating periods, HCl will be stored in quantities less than the RQ.

Sodium Hydroxide

Sodium hydroxide is a strong base that is used in water treatment. It has a very low vapor pressure and therefore poses no risk of atmospheric transport off-site. Sodium hydroxide does pose a risk of soil and water contamination. However, it will be stored within an impervious secondary containment structure that will prevent such contamination. It is staff's conclusion that use of sodium hydroxide poses no risk of impacting surrounding populations in the event of an accidental release at the facility.

Sulfuric Acid

Sulfuric acid would not pose a risk of off-site impacts, because it has a relatively low vapor pressure and thus emissions from spills would be confined to the site. Because of public concern at another proposed energy facility in 1995, staff conducted a quantitative assessment of the potential for impact associated with sulfuric acid use, storage, and transportation. Staff found no hazard would be posed to the public. However, should a fire occur in the immediate vicinity of the sulfuric acid tank, the potential exists for the tank to rupture and for sulfuric acid to become vaporized and migrate off-site. In order to protect against risk of fire causing this accidental release, an additional Condition of Certification (**HAZ-5**) requires the project owner to ensure that no combustible or flammable materials would be stored or used within 100 feet of the sulfuric acid tank. There are no combustible materials proposed to be stored within 100 feet of the sulfuric acid storage areas in the Water/ Wastewater Treatment Area and the Acid Tank near the south side of the cooling towers.

Hydrogen Gas

Staff has some concerns regarding the location of the hydrogen gas cylinder trailer and its proximity to the turbine and other hazardous materials. The proposed location of the ammonia tank and unloading facility is between the nitrogen and hydrogen tanks, less than 50 feet from each of the neighboring tanks. The potential hazard of the close proximity of the hydrogen tanks with regard to flammable and toxic materials hazards would be mitigated by implementation of proposed Condition of Certification **HAZ-11**.

Hydrochloric Acid

In the case with HCl, the infrequent use (10,000 pounds once every three years) poses a small risk of accidental release. While an accidental release of HCl would not cause any potential for significant impact off-site, it could adversely affect plant personnel. In order to reduce the size of any pool potentially resulting from a spill, staff proposes Condition of Certification **HAZ-12** requiring the applicant to erect portable berms to keep any spill contained to a small area.

Sodium Hypochlorite

The aqueous mixture of sodium hypochlorite will likewise have a low potential to affect the off-site public because its vapor pressure is also low and the concentration of hypochlorite is low (10 percent). In fact, hypochlorite is used at many such facilities as a substitute for chlorine gas, which is much more toxic and much more likely to migrate off-site because it is a gas and is stored in concentrated form. Thus, the use of a water solution of sodium hypochlorite is much safer to use than the alternative, which is chlorine gas. However, accidental mixing of sodium hypochlorite with acids or anhydrous ammonia could result in toxic gases. Given the large volumes of both anhydrous ammonia (24,000 gals) and sodium hypochlorite (8000 gals) proposed for storage at this facility, the chances for accidental mixing of the two - particularly during transfer from delivery vehicles to storage tanks - should be reduced as much as possible. Thus, measures to prevent such mixing are extremely important and will be required as an additional section within the required Safety Management Plan for delivery of anhydrous ammonia. However, staff does note that in the AFC (Section 8.6.3.3) the Applicant proposes to separate incompatible materials to prevent accidental mixing and provide separate containment facilities for each material.

Natural Gas

Natural gas poses a fire and/or explosion risk as a result of its flammability. Natural gas is composed of mostly methane but also contains ethane, propane, nitrogen, butane, isobutane and isopentane. It is colorless, odorless, and tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is ninety percent in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or explosions if a release were to occur. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1996), natural gas is very difficult to detonate and virtually never causes the type of unconfined explosions that are often associated with many other fuel gases, such as propane or liquefied petroleum gas. While natural gas will be used in significant quantities, it will not be stored on-site. The risk of a fire and/or explosion on-site can be reduced to insignificant levels through adherence to applicable codes and development and implementation of effective safety management practices. Explosions involving natural gas can occur in combustion equipment such as the Heat Recovery Steam Generator (HRSG) and during start-up. The National Fire Protection Association (NFPA 85A) requires: 1) the use of double block and bleed valves for gas shut-off; 2) automated combustion controls; and 3) burner management systems. These measures will significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures will require air purging of the gas turbines prior to start-up, thus precluding the presence of an explosive mixture. The safety management plan proposed by the applicant will address the handling and use of natural gas and further reduce the potential for equipment failure and explosion or fire due to improper maintenance or human error.

Since the proposed facility will require the installation of a new gas pipeline off-site, impacts from this pipeline were also be evaluated. Current design codes require use of high quality arc welding techniques by certified welders and inspection of welds. Many failures of older natural gas lines have been associated with poor quality welds or corrosion. Current codes address this failure mode by requiring use of corrosion resistant coatings and cathodic corrosion protection. Another major cause of pipeline failure is damage resulting from excavation activities near pipelines. Current codes address this mode of failure by requiring clear marking of the pipeline route. An additional mode of failure particularly relevant to the project area is damage caused by earthquakes. Existing codes also address seismic hazard in design criteria (see discussion below). Evaluation of pipeline performance in recent earthquakes indicates that pipelines designed to modern codes perform well in seismic events while older lines frequently fail. Staff believes that existing regulatory requirements are sufficient to reduce the risk of accidental release from the pipeline to insignificant levels.

Failures of gas pipelines, according to data from the U.S. Department of Transportation (the National Transportation Safety Board) from the period 1984 - 1991, occurred as a result of pipeline corrosion, pipeline construction or materials defects, rupture by heavy equipment excavating in the area such as bulldozers and backhoes, weather effects, and earthquakes. Given the gas line failures which occurred in the Marina District of San Francisco during the 1989 Loma Prieta earthquake, the January 1994 Northridge earthquake in Southern California, the January 1995 gas pipeline failures in Kobe, Japan, as well as the January 19, 1995 gas explosion in San Francisco, the safety of the gas pipeline is of paramount importance. However, it must be noted that those pipelines that failed were older and not manufactured nor installed to modern code requirements.

The natural gas pipeline for the proposed facility will be installed, owned, and operated by the applicant. If loss of containment occurs as a result of pipe, valve, or other mechanical failure or external forces, significant quantities of compressed natural gas could be released rapidly. Such a release could result in a significant fire and/or explosion hazard, which could cause loss of life and/or significant property damage in the vicinity of the pipeline route. However, the probability of such an event is extremely low if the pipeline is constructed according to present standards.

According to the Department of Transportation (DOT) statistics, the frequency of incidentsresulting in fatalities, injury, or significant economic loss is about 0.25 for all pipeline incidents per 1,000 miles per year, or 2.5×10^{-4} incidents per mile per year (SERA 1993). DOT has also evaluated and categorized the major causes of pipeline failure. To summarize, the four major causes of accidental releases from natural gas pipelines are: Outside Forces-43 percent, Corrosion-18 percent, Construction/Material Defects-13 percent, and Other-26 percent.

Outside forces are the primary cause of incidents. Damage from outside forces includes damage caused by use of heavy mechanical equipment near pipelines (e.g., bulldozers and backhoes used in excavation activities), weather effects, vandalism, and earthquake-caused rupture as seen in the Marina District of San Francisco during the 1989 Loma Prieta Quake and in Kobe, Japan in January 1995. The fourth category, “other” includes equipment component failure, compressor station failures, operator errors and sabotage. The average annual service incident frequency for natural gas transmission systems varies with age, the diameter of the pipeline, and the amount of corrosion.

Older pipelines have a significantly higher frequency of incidents. This results from the lack of corrosion protection and use of less corrosion resistant materials compared to modern pipelines, limited use of modern inspection techniques, and higher frequency of incidents involving outside forces. The increased incident rate due to outside forces is the result of the use of a larger number of smaller diameter pipelines in older systems, which are generally more easily damaged and the uncertainty regarding the locations of older pipelines. In the United States, extensive federal and state pipeline codes and safety enforcement minimize the risk of severe accidents related to natural gas pipelines.

Staff believes the worst case scenario for an off-site natural gas impact is a large rupture of the pipeline caused by improper use of heavy equipment near the pipeline. This worst case scenario would not result in a significant asphyxiation hazard since natural gas disperses to the atmosphere rapidly when released. The worst case scenario is primarily a safety hazard to construction workers and nearby residences. The project owner will mark the pipeline in conformance with State and Federal regulations to lower the probability of this occurring.

The following safety features will be incorporated into the design and operation of the natural gas pipeline (as required by current federal and state codes): (1) while the pipeline will be designed, constructed, and tested to carry natural gas at a certain pressure, the working pressure will be less than the design pressure; (2) butt welds will be X-rayed and the pipeline will be tested with water prior to the introduction of natural gas into the line; (3) the pipeline will be surveyed for leakage annually (4) the pipeline will be marked to prevent rupture by heavy equipment excavating in the area; and (5) valves at the meter will be installed to isolate the line if a leak occurs (See Conditions of Certification **HAZ-6 and 7)**.

Anhydrous Ammonia

Based on the discussion above, anhydrous ammonia and natural gas are the only hazardous materials that may pose a risk of off-site impacts. Anhydrous ammonia would be used in controlling the emission of oxides of nitrogen (NO_x) from the combustion of natural gas in the facility. The accidental release of anhydrous ammonia without proper mitigation can result in hazardous down-wind concentrations of ammonia gas. Two pressure vessel tanks will be used to store the anhydrous ammonia with a maximum of 10,200 gallons in each.

The use of anhydrous ammonia can result in the formation and release of a gaseous cloud in the event of a release, even without interaction with other chemicals. This is a result of its relatively high vapor pressure and the large amounts of anhydrous ammonia that will be used and stored on-site. Anhydrous ammonia is a gas at ambient temperature and therefore is stored under pressure. The rupture of a pipe, tank, or valve would likely result in a gas jet of ammonia leaving the containment structure at a high rate. In an actual release the resultant cooling of the ammonia in the tank due to reduced pressure and auto refrigeration would have the effect of lowering the temperature of the ammonia remaining in the containment vessel, limiting the ammonia release rate. However, pursuant to EPA and CAL ARP guidelines, the worst-case off-site consequence analysis did not consider this mitigating effect and instead assessed a catastrophic release of the entire contents of the tank.

To assess the potential impacts associated with an accidental release of ammonia, staff looks at four “bench mark” concentration levels: 1) the lowest concentration posing a risk of lethality, or 2,000 PPM; 2) the Immediately Dangerous to Life and Health (IDLH) level of 300 PPM; 3) the Emergency Response Planning Guideline (ERPG) level 2 of 150 PPM, which is also the RMP level 1 criterion used by EPA and California; and 4) the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75PPM. As part of its analysis of a potential release, staff evaluates the locations at which each of these benchmark concentration levels would be reached. A detailed discussion of the exposure criteria considered by staff and their applicability to different populations and exposure-specific conditions is provided in Appendix A of this analysis. If the potential exposure associated with a postulated release exceeds 75 PPM at any public receptor, staff presumes that the potential may exist for a significant impact. However, staff may also conduct further analysis to refine its estimates and assess the probability of occurrence of the release and/or the nature of the potentially exposed population. Staff may, based on such analysis, ultimately determine that the likelihood and extent of potential exposure are not sufficient to support a finding of potentially significant impact.

The AFC (section 8.12.3) and the response to data requests #2 (EAEC 2001p, page 34 and Attachment HM-69) discuss the modeling parameters for a worst case and alternative case accidental release of anhydrous ammonia. The worst-case release in the AFC is associated with a failure of the ammonia storage tank so that it empties within 10 minutes. An alternative scenario is a failure of a supply truck loading hose spilling a specified amount of anhydrous ammonia. In conducting these two analyses, it was assumed that spilled material would be contained in the covered basin below the storage vessel and below the tanker truck pad. In addition, the applicant assumed winds of 1.0 meter per second and atmospheric stability class F. The U.S. EPA SLAB air dispersion model was used to estimate airborne concentrations of ammonia. This model is designed to predict the maximum possible impacts based on distance from the storage tank without regard to specific direction of transport.

The results of this modeling conducted by the applicant showed that off-site airborne concentrations of ammonia would be above the level the Energy Commission uses for significance (75 ppm), but only for a very short distance from the anhydrous ammonia storage tank or the facility fenceline. The applicant estimated that a concentration of 75 PPM or greater would exist at a distance of 1,476 feet, an area which includes the open space (fields) to the east, south, and north of the facility, and slightly beyond Mountain House Road to the west of the facility. No sensitive receptor would experience this concentration unless working in the fields or driving past the facility at the precise time of the modeled catastrophic release. The probability of a tank failure occurring at the same time farm workers are present, with low winds blowing in the direction of workers and F class atmospheric stability, is too low to be considered plausible. The estimated airborne concentration at the Mountain House School (0.9 miles away) is 10 PPM, a level which would not impact even sensitive people (such as asthmatic children) and which many people would not even smell.

Staff conducted an independent review of the applicant's modeling of a failure of the anhydrous ammonia storage tank and found that the input variables for the SLAB modeling were generally correct for this type of accidental release. Some minor inconsistencies (differences of 1-2%) in input parameters were found when compared to those recommended by the SLAB guidance document, but when SLAB was run with the correct values, the differences in output were negligible.

Transportation of Hazardous Materials

The transportation of hazardous materials to the facility is of concern to the residents and workers in the surrounding community. In particular, several members of the public expressed concern over the potential for an accident involving a chemical spill during delivery. Hazardous materials including anhydrous ammonia, sulfuric acid, and sodium hypochlorite will be transported to the facility via tanker truck. While many types of hazardous materials will be transported to the site, it is staff's belief that transport of anhydrous ammonia poses the predominance of risk associated with such transport and that the risk associated with transportation of other hazardous materials to the proposed facility does not significantly increase the risk of impact beyond that associated with transporting anhydrous ammonia. This opinion is based on the environmental mobility, toxicity, quantities transported, and frequency of delivery of the various chemicals.

If anhydrous ammonia were released from a delivery vehicle (i.e. a tanker truck) during transport, it could result in hazardous ambient concentrations. The extent of impact in the event of such a release would depend on the location and on the rate of dispersion of ammonia vapor from the cloud formed during the release.

To address this concern, staff asked the Applicant to evaluate the risk of an accidental release of anhydrous ammonia while in transport to the project area. The Applicant prepared a transportation risk analysis on October 9, 2001 (EAEC 2001v, page 3). This analysis indicated that the risk associated with transportation of anhydrous ammonia to the EAEC would be insignificant. Staff agrees with this conclusion and the Applicant's focus on the surface streets within the project area after the delivery vehicle leaves the main highway. Staff believes that it is appropriate to rely on the extensive regulatory program that applies to shipment of hazardous materials on California Highways to ensure safe handling in general transportation (see the Federal Hazardous Materials Transportation Law [49 U.S.C. §5101 et seq], the U.S. Department of Transportation Regulations [49 C.F.R. Subpart H, §172-700], and California Department of Motor Vehicles (DMV) Regulations on Hazardous Cargo). These regulations also address the issue of driver competence.

Staff also evaluated the risk of impact associated with the transportation of anhydrous ammonia based on transport statistics developed by Davies and Lees (Lees 1996). Based on this data, the worst-case accident rate for transport by rural multi-lane undivided roads would be applicable to the project area. The maximum rate of accidental release per vehicle mile traveled on such roads is .36 in one million miles traveled (Lees 1996). The incidence of significant spillage per vehicle mile is estimated to be 1×10^{-7}(that is, one in every 10 million miles traveled) For vehicles transporting hazardous materials, about 10% of all accidents cause fatalities. Most of these fatalities occur in the immediate vicinity of the accident. Typically such fatalities are the result of injuries associated with the accident itself not accidental release of cargo. In fact, the average number of fatalities associated with release accidents is only 1% higher than the number of fatalities associated with accidents that did not result in release (Lees 1996). Most accidents involving significant release occur when the transport vehicle either leaves the road, overturns, or collides with a train. On average there were about 10 fatalities per accident, regardless of release. However, as mentioned above, most of these were the result of the accident rather than released materials. Based on differences between the number of fatalities in accidents with and without loss of cargo, staff estimated that 1% of the average fatality rate is due to released materials and the rest are due to the physical injuries that occurred in the accident. Another estimate provided in (Lees 1996) is that for every 40 fatalities associated with hazardous materials transport one is due to release of the hazardous materials cargo.

Further, the occurrence fatalities and injuries as indicated by accident statistics does not imply that such impacts were on nearby populations. In fact, the population most often impacted by ammonia transport accidents is other road users. The potential for impacts on in-route populations near highways will be highly dependent on the proximity of in route populations at the accident location and on other factors present at the time of the accident, such as wind direction and potential for atmospheric dispersion. It is staff's opinion that the risk of impact (injury or fatality) to the populations along the transportation route would be at least one order of magnitude less than the risk of release by itself. Risk of impact is the product of release probability and concurrent probability of worst case atmospheric dispersion conditions and presence of receptors in the area affected by hazardous concentrations. Staff has generally viewed risks with probabilities of less than 1 in 100,000 per year, for up to 10 potential fatalities, as insignificant. Based on the limited number of miles along the route that are in close proximity to proposed populated areas, staff believes that the potential risk per year of more that 10 fatalities associated with ammonia transportation for this project are well below 1 in 1,000,000 per year for in-route populations.

However, one concern that was not adequately addressed in the available accident statistics is the potential effect of dense fog on the accident rate. Dense fog frequently occurs in the project area and has been associated with very serious accidents. It is staff's belief that involvement of an ammonia transport vehicle in such an accident could result in loss of cargo and that transport would potentially increase risk of impact to both in-route populations and road users. Staff concludes that the risks associated with transportation of anhydrous ammonia are insignificant during normal driving conditions. However, staff believes that shipments should not occur when heavy fog is present on the delivery route. Staff therefore, has proposed Condition of Certification **HAZ- 8**. This condition restricts delivery when dense fog is present along the delivery route.

In light of the proposed development along Byron Bethany Road, staff further evaluated the relative risk of transporting aqueous ammonia and anhydrous ammonia. The use of aqueous ammonia would likely increase the number of hazardous materials tanker truck vehicle miles traveled per year by more than three-fold. Since most fatalities associated with the transportation of hazardous materials such as ammonia are the result of the vehicular accident and not loss of cargo, it can be argued that based strictly on vehicle miles travel and number of trips taken, the use of aqueous ammonia could possibly increase the risk to road users. This would only be true if all other factors remained the same and only the number of trips (not the time of day or the presence of other drivers) were changed.

Although staff concludes that the risks of impact from the transportation of anhydrous ammonia are insignificant, it should be noted that many members of the public have expressed concern regarding transportation of anhydrous ammonia near their communities. While the risk associated with transportation of anhydrous ammonia is very low and well within accepted norms, it is readily feasible to use aqueous ammonia. It is staff's conclusion that in the absence of a significant risk from the use of anhydrous ammonia at this proposed facility, staff can find no basis for recommending a requirement to use aqueous ammonia based on transport risks.

Because of concerns about future development along the anhydrous ammonia transportation route, staff asked the applicant to provide additional information about road improvements and land uses along the route. In response to staff's inquiry regarding transportation of anhydrous ammonia, the applicant prepared an additional response and analysis (EAEC 2002b). The applicant provided documentation that the transportation route will be improved during the construction of the Mountain House Community. Road improvements included increasing the width of the roads, adding left turn and merging lanes, adding raised medians, and adding lanes in both directions. Thus, the roads would be changed from the existing one-lane non-divided roads to a divided road with two lanes in each direction. Staff finds that these road improvements greatly increase the safety of traffic flow and hence would significantly reduce the risk associated with transportation of hazardous materials to the proposed facility. The applicant also clarified the hazardous materials transportation route to include two routes: I-5 to I-205 to Grant Line Road to Byron Road to Mountain Home Road to the project and I-5 to I-205 to Mountain House Parkway to Byron Road to Mountain Home Road to the project. Both of these routes would pass through the new Mountain House Community on Byron Road. The second route would also pass through the new community on Mountain House Parkway. The applicant also provided a detail of the planned land uses along the route within the proposed Mountain House Community. Land uses along the route would include commercial and some residential. Most residences would be located off the routes but within 1,000 feet. The closest school would be located just beyond 1,000 feet from the road.

To address the issue of tanker truck safety, the Applicant stated that ammonia would be delivered to the proposed facility only in certified vehicles with a design capacity of 7,500 gallons. These vehicles will be designed to DOT Code MC-330 or MC-331. These are high integrity vehicles designed for hauling caustic materials under pressure such as anhydrous ammonia. Staff has proposed an additional Condition of Certification **HAZ-9** to ensure that, regardless of which vendor supplies the ammonia, delivery will be made in a tanker truck which meets or exceeds the specifications described by these regulations.

Additionally, the project owner will be required to instruct vendors that only the Energy Commission approved transportation routes are allowed (Condition of Certification **HAZ-10**). This requirement will also apply to the transportation of hazardous wastes for disposal. Thus, no hazardous materials deliveries or hazardous waste transport will pass by the Mountain House School.

Seismic Issues

The possibility exists that an earthquake might cause the failure of a hazardous materials storage tank and rupture of the natural gas pipeline. The quake could also cause the failure of the secondary containment system (berms and dikes) as well as electrically controlled valves, pumps, neutralization systems and the foam vapor suppression system. The failure of all these preventive control measures might then result in a vapor cloud of hazardous materials moving off-site and impacting the residents and workers in the surrounding community. The effects of the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan, heightened concerns regarding earthquake safety

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to several large storage tanks and smaller tanks associated with the water treatment system of a cogeneration facility. Those tanks with the greatest damage - including seam leakage - were older tanks, while the newer tanks sustained displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards, which should be followed in adequately designing and building storage tanks, containment areas, and the natural gas pipeline in order to withstand a large earthquake. Staff notes that the proposed facility will be designed and constructed to the applicable standards of the Uniform Building Code for Seismic Zone 3, CPUC General Order 112E, and Title 49, California Code of Regulations, section 192.

Security Issues

This facility proposes to use anhydrous ammonia. This chemical has been identified by the U.S. EPA as a hazardous material where special site security measures must be developed and implemented to ensure that unauthorized access is prevented. The EPA published a Chemical Accident Prevention Alert regarding Site Security (EPA 2000a) and a Chemical Safety Alert (EPA 2000) concerning precautions to take to prevent theft of anhydrous ammonia. The U.S. Department of Justice published a special report on Chemical Facility Vulnerability Assessment Methodology (U.S. DOJ 2002). In order to ensure that this facility or a shipment of anhydrous ammonia is not the target of unauthorized access, staff's proposed General Condition of Certification on Construction and Operations Security Plan **COM-8** will require the project owner to prepare a Vulnerability Assessment and implement Site Security measures consistent with the above-referenced documents.

CUMULATIVE IMPACTS

Staff reviewed the potential for the operation of the East Altamont Energy Center combined with the existing Aqua Chlor facility located approximately 7 miles from the project site. Staff concludes that the distance separating these facilities precludes the risk of both facilities effecting the same population.

ENVIRONMENTAL JUSTICE

Staff has reviewed Census 2000 information that shows the minority population is less than fifty percent within a six-mile radius of the proposed EAEC (please refer to **Socioeconomics Figure 1** in this Staff Analysis), and Census 1990 information that shows the minority/low income population is less than fifty percent within the same radius. However, there is a pocket of minority persons within six miles that staff has considered for impacts. Staff did not identify a significant impact on any population and concludes that there will be no significant impact on any minority/low income population.

APPLICANT'S PROPOSED MITIGATION

The potential for accidents resulting in the release of hazardous materials is greatly reduced by the implementation of a safety management program, which includes the use of both engineering and administrative controls. Administrative controls include the development and implementation of a Safety Management Plan. Elements of facility controls and the safety management plan are summarized below.

ENGINEERING CONTROLS

Engineering controls help to prevent accidents and releases (spills) from moving off-site and impacting the community by incorporating engineering safety design criteria into the design of the facility. The engineered safety features proposed by the applicant for use at this facility include:

construction of dikes, berms, and/or catchment basins in the hazardous materials storage areas to contain accidental releases that might happen during storage or delivery;

physical separation of stored chemicals in separate containment areas in order to prevent accidental mixing of incompatible materials which may result in the evolution and release of toxic gases or fumes;

a secondary containment structure surrounding the anhydrous ammonia storage tanks equipped with a roof and a water-spray system to “knock-down” much of the anhydrous ammonia if accidentally released;

secondary containment areas surrounding other large quantity chemical tanks; and

a sloped containment pad that will drain into a sump placed beneath the tanker truck anhydrous ammonia delivering area; sumps will be provided for each of the secondary diked areas around each large chemical storage tank.

ADMINISTRATIVE CONTROLS

Administrative controls also help to prevent accidents and releases (spills) from moving off-site and impacting the community by establishing worker training programs, process safety management programs and by complying with all applicable health and safety laws, ordinances, regulations, and standards.

The worker health and safety program proposed by the Applicant for use at this facility will include (but is not limited to) the following elements:

worker training regarding chemical hazards, health and safety issues, and hazard communication;

the proper use of personal protective equipment;

safety operating procedures for operation and maintenance of systems utilizing hazardous materials; and

fire safety and prevention; and emergency response actions including facility evacuation, and hazardous material spill cleanup.

At the facility, the project owner will be required to designate an individual who has the responsibility and authority to ensure a safe and healthful workplace. The project health and safety professional oversees the health and safety program and has the authority to halt any action or modify any work practice in order to protect the workers, facility, and the surrounding community or in the event that the health and safety program is violated.

A facility Process Safety Management Program is required for the facility. This is a program for the regular inspection and maintenance of equipment, valves, piping, and appurtenances. Additionally, the process safety management program requires that only trained facility personnel are assigned to the transfer and handling of hazardous chemicals.

In order to address the issue of spill response, the facility will prepare and implement an Emergency Response Plan which includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, etc. Emergency procedures will be established that include evacuation, spill cleanup, hazard prevention, and emergency response.

STAFF'S PROPOSED MITIGATION

The worst-case accidental release scenarios prepared by the Applicant (EAEC 2001v, page 34) assumed that a large leak would occur in the anhydrous ammonia storage vessel thus releasing the entire contents into the air and the basin below the storage vessel, and from transfer hose from a tanker truck onto the ground. Staff believes that the most likely event resulting in a spill on-site would be during transfer from the delivery tanker to the storage tank. Staff therefore proposes a condition requiring development of a Safety Management Plan for the delivery of anhydrous ammonia. The development of a Safety Management Plan addressing delivery of ammonia will further reduce the risk of any accidental release not addressed by the proposed spill prevention mitigation measures of the required Risk Management Plan (RMP).

To address transportation risks staff proposes requiring the use of specific routes for delivery, requiring use of high integrity vehicles, and restricting delivery during hazardous fog conditions. Staff has not recommended requiring the use of aqueous ammonia. However, its use would be feasible.

FACILITY CLOSURE

The requirements for the handling of hazardous materials would remain in effect until such materials are removed from the site regardless of facility closure. Therefore, the facility owners are responsible for continuing to handle such materials in a safe manner, as required by applicable laws. In the event that the facility owner abandons the facility in a manner which poses a risk to surrounding populations, staff will coordinate with the California Office of Emergency Services, Alameda County Environmental Health Department, and the California Department of Toxic Substances Control (DTSC) to ensure that any unacceptable risk to the public is eliminated. Funding for such emergency action can be provided by federal, state or local agencies until the cost can be recovered from the responsible parties (O.E.S. 1990).

RESPONSE TO PUBLIC AND AGENCY COMMENTS

AGENCY COMMENTS

San Joaquin County Board of Supervisors

Comment: *The Board of Supervisors stated its opposition to the facility unless certain environmental concerns were addressed.*

Response: Staff has evaluated the comments of the SJC Board of Supervisors and has proposed several Conditions of Certification which will mitigate hazardous materials impacts to a level of insignificant risk.

PUBLIC COMMENTS

G&DK-1 *Gary and Dolores Kuhn expressed concern about the proximity of Mountain House School to the EAEC project and the danger of transporting and storing ammonia that could potentially harm the public. They also asked if an ammonia leak would necessitate a warning and shelter at the Mountain House School.*

Response: The worst-case facility accidental release analysis showed that if the entire contents of the anhydrous ammonia tank were to spill, the airborne concentration at the school would be about 10 PPM, barely perceptible by smell. No adverse health effects would be expected, even in sensitive children, at this level. No warning system or shelter would be necessary.

G&DK-8 *Mr. and Mrs. Kuhn commented that Calpine has not committed to saying how many gallons of ammonia will be transported and are vague about how many times a week.*

Response : The Applicant has stated that anhydrous ammonia will be delivered 37 times per year. The tank truck will have a capacity of 7,500 gallons. The two storage vessels each have a capacity of 10,000 gallons.

G&DK-17 *Mr. And Mrs. Kuhn requested an explanation to why anhydrous ammonia is used instead of aqueous ammonia.*

Response: The applicant has proposed to use anhydrous ammonia. Staff evaluated the storage, use, and transportation of anhydrous ammonia and, after mitigation, could find no significant impact. Therefore, staff could find no basis for recommending a requirement to use aqueous ammonia. The applicant claims that anhydrous ammonia is less expensive and because it is more concentrated than the aqueous form, will result is fewer tanker truck trips from the Interstate through the community.

J&DH-1 *Mr. And Mrs. Hayes asked for mandatory routing of anhydrous ammonia shipments to be on Byron Highway only and never past the school.*

Response: Proposed Condition of Certification HAZ-10 requires the Byron Highway route to be used. No hazardous material or hazardous waste will be transported past the Mountain House School.

JHS-1 *Ms. Holly-Sheehan is concerned over the safety of the public and in particular the school children located at Mountain House School, less than 1 mile from the proposed facility.*

Response: Staff has thoroughly evaluated the applicant's proposed handling, storage, and transfer methods for all hazardous materials (in particular, anhydrous ammonia) as well as the applicant's off-site consequence analysis. Staff is confident that when implemented, the Applicant's safety program will prevent accidental releases and should one occur, these measures will ensure that there are no impacts to the off-site public. Based on the off-site consequence air modeling conducted by the Applicant, the airborne concentration of ammonia at the school during a worst-case catastrophic release would be 10 ppm. Staff's review of the scientific literature on the health effects of ammonia show that some people might be able to smell an odor at this concentration while others would not, but that no adverse impacts would occur even in sensitive individuals (such as asthmatic children).

G&MG-2 *Mr. And Mrs. Griffith also expressed concern about the potential risks posed to students at Mountain House School.*

Response: Please refer to the response above.

G&MG-3 *Mr. And Mrs. Griffith also expressed concern about the potential risks posed by ammonia and the natural gas pipeline.*

Response: It is doubtful that any ammonia odor will be noticeable at the facility, let alone off-site, during normal operations. The engineering controls designed to mitigate a spill will again restrict any odors to on-site and near-site distances. As stated above, based on the off-site consequence air modeling conducted by the Applicant, the airborne concentration of ammonia at the school during a worst-case catastrophic release would be 10 ppm. Staff's review of the scientific literature on the health effects of ammonia show that some people might be able to smell an odor while others would not but that no adverse impacts would occur even in sensitive individuals (such as asthmatic children). The natural gas pipeline (the original and most recently proposed alternative routes) will be constructed, marked, and monitored as per U.S. DOT and California PUC regulations. Staff has also proposed several conditions of certification to further ensure safety of the gas pipeline. This will reduce the likelihood of gas line failure to insignificant levels.

SCOPING MEETING COMMENTS AND RESPONSES

Comment 7: *Is the plant a possible target for terrorist activity?*

Response: All private and public infrastructure are possible (but not very probable) targets for terrorist activity. Potentially catastrophic accidents (which may be similar to terrorist events) are analyzed in the Hazardous Materials Management Section. In this section, both the gas pipeline and ammonia tanks and procedures are evaluated. An emergency action plan and a fire prevention plan are required, as stated in the Worker Safety and Fire Protection Section. Staff has additionally proposed a Condition of Certification (HAZ-13) that would require the project owner to prepare a Vulnerability Assessment and implement Site Security measures consistent with US EPA and US Department of Justice guidelines.

CONCLUSIONS AND RECOMMENDATIONS

Staff's evaluation of the proposed project (with staff's proposed mitigation measures) indicates that hazardous materials use will pose little potential for significant impacts on the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations and standards (LORS).

In response to Health and Safety Code, section 25531 et seq., the applicant will be required to develop an RMP. To insure adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by the U.S. EPA, Alameda County, and staff. In addition, staff's proposed conditions of certification require Alameda County to review, and staff to approve, the RMP prior to delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, and use of ammonia.

With adoption of staff's proposed conditions of certification, the project will also comply with Health and Safety Code, section 41700, and it will not pose any potential for significant impacts to the public from hazardous materials releases.

Staff recommends the Energy Commission adopt the proposed conditions of certification, presented herein, to ensure that the project is designed, constructed and operated to comply with applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous material not listed in Appendix C, below, or in greater quantities than those identified by chemical name in Appendix C, below, unless approved in advance by the CPM.

Verification: The project owner shall provide to the CPM, in the Annual Compliance Report, a list of hazardous materials contained at the facility in reportable quantities.

HAZ-2 The project owner shall concurrently provide a Business Plan (BP) and a Risk Management Plan (RMP) to the Certified Unified Program Authority - CUPA (Alameda County Environmental Management Department) and the CPM for review at the time the RMP is first submitted to the U.S. Environmental Protection Agency (EPA). The project owner shall include in the Business Plan all hazardous materials at the site and at lineal facilities and shall reflect all recommendations of the CUPA and the CPM in the final BP and RMP documents. Copies of the final Business Plan and RMP, reflecting all comments, shall be provided to the CPM.

Verification: At least 60 days prior to receiving any hazardous material on the site, the project owner shall provide a copy of a final Business Plan to the CPM. At least 60 days prior to delivery of ammonia to the site, the project owner shall provide the final EPA-approved RMP to the CUPA and the CPM.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of ammonia. The plan shall include procedures, protective equipment requirements, training, and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of ammonia with incompatible hazardous materials.

<u>Verification:</u> At least sixty (60) days prior to the delivery of ammonia to the facility, the project owner shall provide a safety management plan as described above to the CPM for review and approval.

HAZ-4 The ammonia storage facility shall be designed to either the ASME Pressure Vessel Code (ANSI K61.6) or to API 620. In either case, a secondary containment basin capable of holding 150% of the storage volume shall protect the storage tank plus the volume associated with 24 hours of rain assuming the 25-year storm. The final design drawings and specifications for the ammonia storage tank and secondary containment basins shall be submitted to the CPM.

<u>Verification:</u> At least sixty (60) days prior to delivery of ammonia to the facility, the project owner shall submit final design drawings and specifications for the ammonia storage tank and secondary containment basin to the CPM for review and approval.

HAZ-5 The project owner shall ensure that no combustible or flammable material is stored within 100 feet of the sulfuric acid tank.

<u>Verification:</u> At least sixty (60) days prior to receipt of sulfuric acid on-site, the Project Owner shall provide copies of the facility design drawings showing the location of the sulfuric acid storage tank and the location of any tanks, drums, or piping containing any combustible or flammable material and the route by which such materials will be transported through the facility.

HAZ-6 The project owner shall require that the gas pipeline undergo a complete design review and detailed inspection after 30 years and every 5 years thereafter.

<u>Verification:</u> At least thirty (30) days prior to the initial flow of gas in the pipeline, the project owner shall provide a detailed plan to accomplish full and comprehensive pipeline design reviews in the future to the CMP for review and approval. This plan shall be amended, as appropriate, and submitted to the CPM for review and approval, not later than one year before the plan is implemented.

HAZ-7 After any significant seismic event in the area where surface rupture occurs within one mile of the pipeline, the gas pipeline shall be inspected by the project owner.

<u>Verification:</u> At least thirty (30) days prior to the initial flow of gas in the pipeline, the project owner shall provide a detailed plan to accomplish a full and comprehensive pipeline inspection in the event of a significant earthquake to the CMP for review and approval. This plan shall be amended, as appropriate, and submitted to the CPM for review and approval, at least every five years.

<u>HAZ-8</u> The project owner shall direct all vendors delivering ammonia to the site during the months of November through April to verify that fog conditions do not exist along state roads used for the delivery by calling the CALTRANS Highway Information Network prior to commencing delivery. If fog conditions exist, then delivery of anhydrous ammonia to the site shall be postponed until such time that the fog conditions have abated

Verification: At least sixty (60) days prior to receipt of ammonia on-site, the project owner shall submit to the CPM for review and approval, a copy of the letter to be mailed to the vendors. The letter shall state the required policy for verification of road conditions.

HAZ-9 The project owner shall direct all vendors delivering ammonia to the site to use only tanker truck transport vehicles which meet or exceed the specifications of DOT Code applicable to the type of ammonia used.

Verification: At least sixty (60) days prior to receipt of ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

HAZ-10 The project owner shall direct all vendors delivering any hazardous material to, or hazardous wastes away from, the site to use only the routes approved by the CPM (Interstate 205 to Mountain House Parkway or I-205 to Grant Line Road, and then to the Byron Bethany road to Mountain House Road to the facility). An alternate route may be used following approval by the CPM.

Verification: At least sixty (60) days prior to receipt of any hazardous materials on site, the project owner shall submit to the CPM for review and approval, a copy of the letter to be mailed to the vendors. The letter shall state the required transportation route limitation.

HAZ-11 The project owner shall ensure that the hydrogen gas storage cylinders are stored in an area out of area potentially affected by a turbine over-speed accident and that no combustible or flammable material is stored within 50 feet of the hydrogen cylinders.

Verification: At least sixty (60) days prior to receipt of hydrogen gas on-site, the project owner shall provide copies of the facility design drawings showing the location of the hydrogen gas cylinders and the location of any tanks, drums, or piping containing any combustible or flammable material and the route by which such materials will be transported through the facility.

HAZ-12 The project owner shall ensure that whenever the HRSG is cleaned with hydrochloric acid (HCl), a temporary berm shall be erected around the HCl storage vessel limiting the area of a spill to the smallest possible.

Verification: At least sixty (60) days prior to the initial receipt of HCl on-site, the project owner shall provide copies of the temporary berm design drawings to the CPM for review and approval.

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APPENDIX A

HAZARDOUS MATERIAL MANAGEMENT

BASIS FOR STAFF'S USE OF 75 PPM AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 PPM to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by EPA and Cal/EPA in evaluating such releases pursuant the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's CEQA analysis. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines (ERPGs) states that "these values have been derived as planning and emergency response guidelines, not exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. CEQA requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through changes to the proposed project.

Staff has chosen to use the National Research Council's 30 minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events, and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL. Appendix B provides a summary of adverse effects, which might be expected to occur at various airborne concentrations of ammonia.

HAZARDOUS MATERIAL MANAGEMENT
APPENDIX A TABLE 1

Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH[2]	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 min.	Exposure above this level requires the use of “highly reliable” respiratory protection and poses the risk of death, serious irreversible injury or impairment of the ability to escape.
IDLH/10[1]	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 min.	Protects nearly all segments of general population from irreversible effects
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 min. 4 times per 8 hr day	No toxicity, including avoidance of irritation
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 min.	Significant irritation but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one time exposure
STPEL[4]	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 min. 30 min. 10 min.	Significant irritation but protects nearly all segments of general population from irreversible acute or late effects. One time accidental exposure
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. Work shifts
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 min.	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin)

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)

* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.

** The (NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The (WHO 1986) warns that the young, elderly, asthmatics, those with bronchitis and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

References for Appendix A, Table 1
AIHA. 1989. American Industrial Hygienists Association, Emergency Response Planning Guideline, Ammonia, (and Preface) AIHA, Akron, OH.

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NIOSH. 1994. National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Washington D.C., Publication numbers 94-116.

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Abbreviations for Appendix A, Table 1

ACGIH, American Conference of Governmental and Industrial Hygienists
AIHA, American Industrial Hygienists Association
EEGL, Emergency Exposure Guidance Level
EPA, Environmental Protection Agency
ERPG, Emergency Response Planning Guidelines
IDLH, Immediately Dangerous to Life and Health Level
NIOSH, National Institute of Occupational Safety and Health
NRC, National Research Council
STEL, Short Term Exposure Limit
STPEL, Short Term Public Emergency Limit
TLV, Threshold Limit Value
WHO, World Health Organization

Appendix B

SUMMARY OF ADVERSE HEALTH EFFECTS OF AMMONIA

638 PPM

WITHIN SECONDS:

Significant adverse health effects;

Might interfere with capability to self rescue;

Reversible effects such as severe eye, nose and throat irritation.

AFTER 30 MINUTES:

Persistent nose and throat irritation even after exposure stopped;

irreversible or long-lasting effects possible: lung injury;

Sensitive people such as the elderly, infants, and those with breathing problems (asthma) experience difficulty in breathing;

asthmatics will experience a worsening of their condition and a decrease in breathing ability, which might impair their ability to move out of area.

266 PPM

WITHIN SECONDS:

Adverse health effects;

Very strong odor of ammonia;

Reversible moderate eye, nose and throat irritation.

AFTER 30 MINUTES:

Some decrease in breathing ability but doubtful that any effect would persist after exposure stopped;

Sensitive persons: experience difficulty in breathing;

asthmatics: may have a worsening condition and decreased breathing ability, which might impair their ability to move out of the area.

64 PPM

WITHIN SECONDS:

Most people would notice a strong odor;

Tearing of the eyes would occur;

Odor would be very noticeable and uncomfortable.

Sensitive people could experience more irritation but it would be unlikely that breathing would be impaired to the point of interfering with capability of self rescue

Mild eye, nose, or throat irritation

Eye, ear, & throat irritation in sensitive people asthmatics might have breathing difficulties but would not impair capability of self rescue

22 or 27 PPM

WITHIN SECONDS:

Most people would notice an odor;

No tearing of the eyes would occur;

Odor might be uncomfortable for some;

sensitive people may experience some irritation but ability to leave area would not be impaired;

Slight irritation after 10 minutes in some people.

4.0, 2.2, or 1.6 PPM

No adverse effects would be expected to occur;

doubtful that anyone would notice any ammonia (odor threshold 5 - 20 PPM);

Some people might experience irritation after 1 hr.

APPENDIX C

[Attach AFC Supplement B Table HM-2 here.]